

## **ABSTRACT**

A multi-section semiconductor laser diode is disclosed. The laser diode includes a complex-coupled DFB laser section that includes a complex-coupled grating and an active structure for controlling the intensity of oscillating laser light, to oscillate laser light in a single mode, and an external cavity including a phase control section and an amplifier section, the phase control section having a passive waveguide that controls a phase variation of feedback laser light, the amplification section having an active structure that controls the strength of the feedback laser light. Currents are separately provided to the three sections to generate optical pulses with tuning range of tens of GHz. Applications include the clock recovery in the 3R regeneration of the optical communication.